

CLAIMS:

1. A light source device for generating extreme ultra violet light by irradiating a target with a laser beam, said device comprising:

5 a target supply unit for supplying a material which becomes said target;

a laser unit including an oscillation stage laser having a lower-order transverse mode and at least one amplification stage laser for amplifying a lower-order transverse mode laser beam generated by said oscillation stage laser, for
10 irradiating said target with the amplified laser beam so as to generate plasma; and

a collection optical system for collecting the extreme ultra violet light emitted from said plasma to output the
15 collected extreme ultra violet light.

2. The light source device according to claim 1, wherein said laser unit is formed in accordance with an MOPA (master oscillator power amplifier) system by using the amplification stage laser having no laser resonator.

20 3. The light source device according to claim 1, wherein said laser unit is formed in accordance with an injection locking system (ILS) by using the amplification stage laser having a laser resonator.

4. The light source device according to claim 1, wherein
25 each of said oscillation stage laser and said at least one amplification stage laser includes a YAG laser.

5. The light source device according to claim 2, wherein

each of said oscillation stage laser and said at least one amplification stage laser includes a YAG laser.

6. The light source device according to claim 3, wherein each of said oscillation stage laser and said at least one
5 amplification stage laser includes a YAG laser.

7. The light source device according to claim 4, wherein said oscillation stage laser includes a single mode YAG laser.

8. The light source device according to claim 4, wherein said at least one amplification stage laser includes a
10 high-powered YAG laser.

9. The light source device according to claim 5, wherein said at least one amplification stage laser includes a high-powered YAG laser.

10. The light source device according to claim 1, wherein
15 each of said oscillation stage laser and said at least one amplification stage laser includes a carbon dioxide laser using as a laser medium a mixed gas including carbon dioxide gas.

11. The light source device according to claim 2, wherein
20 each of said oscillation stage laser and said at least one amplification stage laser includes a carbon dioxide laser using as a laser medium a mixed gas including carbon dioxide gas.

12. The light source device according to claim 3, wherein
25 each of said oscillation stage laser and said at least one amplification stage laser includes a carbon dioxide laser using as a laser medium a mixed gas including carbon dioxide

gas.

13. The light source device according to claim 10, wherein said oscillation stage laser includes a pulse carbon dioxide laser.

5 14. The light source device according to claim 10, wherein said at least one amplification stage laser includes a CW (continuous wave) carbon dioxide laser.

15. The light source device according to claim 11, wherein said at least one amplification stage laser includes a CW
10 (continuous wave) carbon dioxide laser.

16. The light source device according to claim 10, wherein said at least one amplification stage laser includes a TEA (transversely exited atmospheric) carbon dioxide laser.

17. The light source device according to claim 11, wherein
15 said at least one amplification stage laser includes a TEA (transversely exited atmospheric) carbon dioxide laser.

18. Exposure equipment comprising:

a light source device for generating extreme ultra violet light by irradiating a target with a laser beam, said light
20 source device having a target supply unit for supplying a material which becomes said target, a laser unit including an oscillation stage laser having a lower-order transverse mode and at least one amplification stage laser for amplifying a lower-order transverse mode laser beam generated by said
25 oscillation stage laser, for irradiating said target with the amplified laser beam so as to generate plasma, and a collection optical system for collecting the extreme ultra

violet light emitted from said plasma to output the collected extreme ultra violet light;

an illumination optical system for collecting the extreme ultra violet light generated by said light source device onto a mask by using plural mirrors; and

a projection optical system for exposing an object to light by using the extreme ultra violet light reflected from said mask.

19. The exposure equipment according to claim 18, wherein said laser unit of said light source device is formed in accordance with an MOPA (master oscillator power amplifier) system by using the amplification stage laser having no laser resonator.

20. The exposure equipment according to claim 18, wherein said laser unit of said light source device is formed in accordance with an injection locking system (ILS) by using the amplification stage laser having a laser resonator.